

# *U.S. Nitrogen Control Programs & Research*

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# Presentation Overview


- Context for U.S. nitrogen emission control programs
- U.S. International Agreements
- Nitrogen control programs
- Projected future emission control programs
- Current research on reactive nitrogen

# Responsibility for Nitrogen Programs

- U.S. State Department
  - International Agreements and Protocols
- U.S. Department of Agriculture
  - Nutrient management programs
  - Soils management programs
- U.S. Environmental Protection Agency
  - Clean Water Act
    - Regulation of discharges and voluntary programs for runoff
    - Regulation of concentrated animal feeding operations
  - Clean Air Act
    - Regulation of air emissions from stationary & mobile sources



# International Agreements

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- **1991 U.S. Canada Air Quality Agreement**
    - provides a mechanism for both countries to cooperate in reducing nitrogen and sulfur emissions that contribute to trans-boundary environmental issues, such as acid rain, ozone, and fine particulate matter.
  - **LRTAP Gothenburg Protocol**
    - The 1999 Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone entered into force in 2005 . This multi-pollutant, multi-effects Protocol sets emission ceilings for 2010 for SO<sub>x</sub>, NO<sub>x</sub>, VOCs, and ammonia.

# U.S. Department of Agriculture

Most federal programs affecting fertilizer management are directed at encouraging producers to alter cropping or nutrient application practices.

- Regulatory programs
  - nutrient use regulations affecting producers of large confined animal operations
  - via nutrient management plan
- Voluntary programs
  - cost-sharing incentives
  - educational and technical assistance
  - nutrient management plans

# U.S. Department of Agriculture

- **Natural Resources Conservation Service**
  - provides technical and financial assistance to help private landowners conserve soil, water, air, plant and animal resources
- **Agriculture Air Quality Task Force**
  - advises the Secretary of Agriculture on the scientific basis of the impact of agriculture on air quality
- **Energy Estimator for Nitrogen**
  - a Web-based tool for farmers and ranchers to identify potential nitrogen cost savings associated with major crops and commercial nitrogen fertilizer applications

# Regulation of Nitrogen Discharges to Water

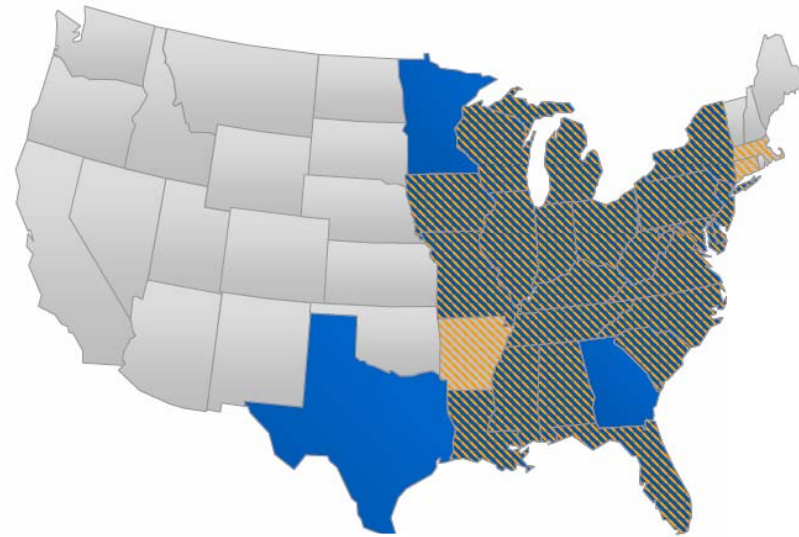
- **Clean Water Act (CWA)**
  - **Sources must get a National Pollutant Discharge Elimination System (NPDES) permit prior to discharge**
    - Ammonia limits may be required
    - Exempts all agricultural sources except CAFOs
  - **Authorizes EPA to develop effluent guidelines for Concentrated Animal Feeding Operations (CAFOs)**
  - **Requires Total Daily Maximum Loads for watersheds**
    - Must account for atmospheric deposition
    - Some authority to regulate deposition is under the CAA
  - **Non-point source incentive program seeks to limit nitrogen in storm water runoff**

# Regulation of Nitrogen Emissions to Air

- **Clean Air Standards**
  - National Ambient Air Quality Standards
  - Regional Haze – Clean Air Visibility Rule
- **Mobile Sources**
  - On-road Vehicles/Engines
  - Heavy-duty diesel trucks
  - Non-road diesel engines – substantial control
  - Locomotives, commercial marine - recently proposed
- **Stationary Sources**
  - Technology-based national standards for major sources and case by case emission limits for stationary industrial sources
    - For examples, new source performance standards for reciprocating internal combustion engines
- **Emission Trading Programs**
  - Programs focus on power sector emissions sources
  - Acid Rain Program
  - NO<sub>x</sub> Budget Trading Program
  - Clean Air Interstate Rule (2009)

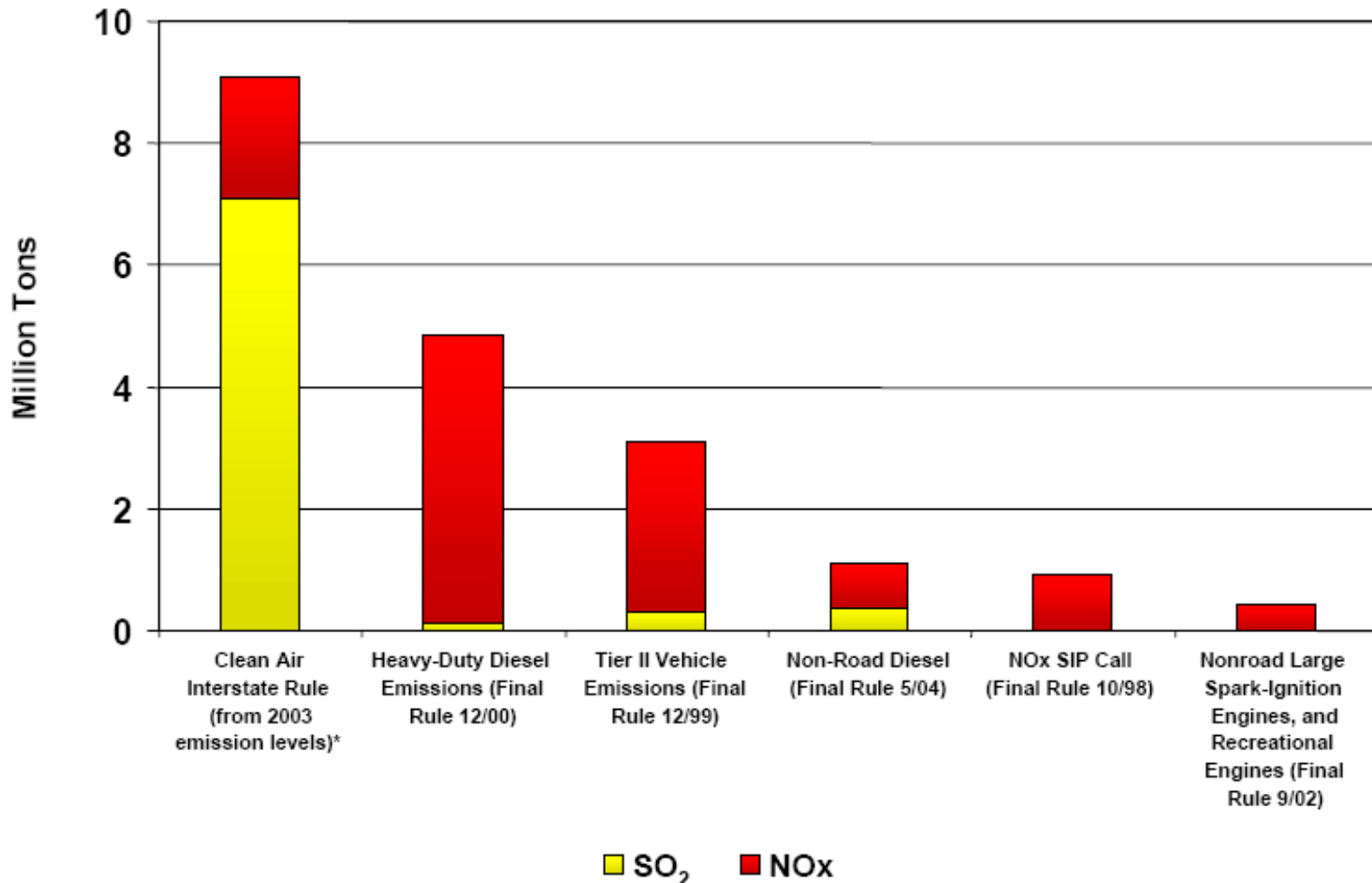
# NO<sub>x</sub> and the Clean Air Interstate Rule (CAIR)

**CAIR, in conjunction with existing NO<sub>x</sub> programs, is projected to reduce power sector ozone season NO<sub>x</sub> emissions by 40% and annual NO<sub>x</sub> emissions by 55 % from 2005 levels.**



# NO<sub>x</sub> Air Reductions

## Annual Emission Reductions at Full Implementation\* for CAIR and Other Major Air Pollution Rules Since 1990



\*These reductions are calculated from 2003 levels and do not reflect the full phase in of the acid rain program. Full implementation for mobile source rules is 2030. Full implementation for the CAIR is between 2020 and 2025.

# Reporting of Nitrogen Releases

- **Comprehensive Environmental Response Compensation Liability Act (CERCLA)**
  - Requires reporting of release of ammonia to the National Response Center if equal to or greater than the “reportable quantities”
    - Ammonia – 100 lbs/ day
- **Emergency Planning and Community Right-To-Know (EPCRA)**
  - Reporting requirements on ammonia to states and locals



# Research on Nitrogen

- **US EPA Science Advisory Board, Integrated Nitrogen Committee**
  - to make recommendations on an integrated research program on reactive nitrogen nationally
  - to identify opportunities of integrated research for nitrogen management
- **US EPA Ecological Research Program, Nitrogen Implementation Plan**
  - to relate and connect the nitrogen cascade to ecosystem services
  - local, regional, to national scale research



# Research on Nitrogen

- **USDA – Agricultural Research Service**
  - to conduct research to develop and transfer solutions to agricultural problems and to provide access and dissemination of information
  - 95 active projects on nitrogen in 2007
  
- **USDA – Cooperative State Research, Education, and Extension Service (CSREES)**
  - to advance knowledge for agriculture, the environment, human health and well-being, and communities through national program leadership and federal assistance
  - 50 active projects on nitrogen in 2007



# For More Information

**U.S. National Focal Point**

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